

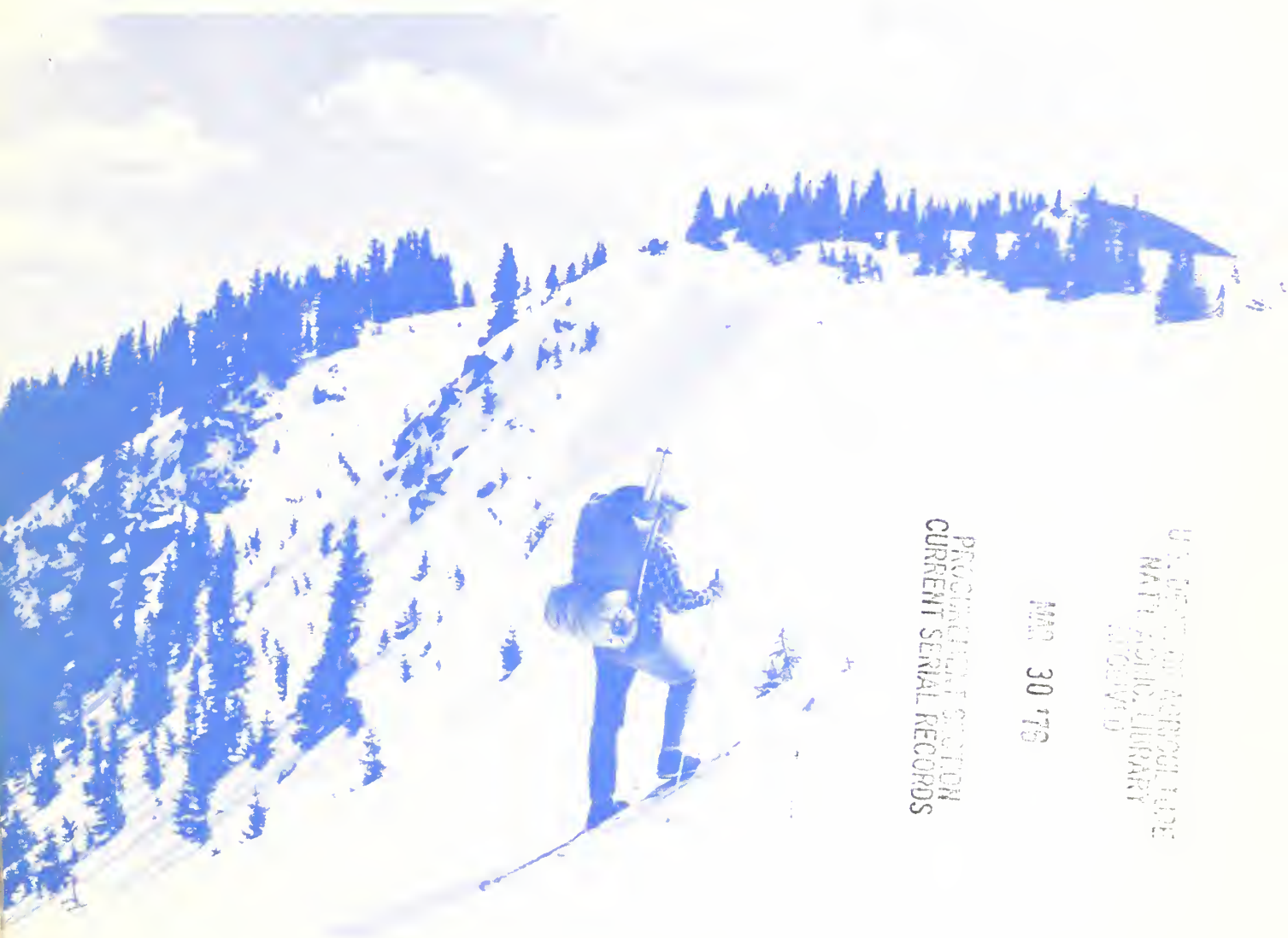
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WATER SUPPLY OUTLOOK FOR WESTERN UNITED STATES

Including Columbia River Drainage in Canada



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MAR 30 1978

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U. S. DEPARTMENT of AGRICULTURE ★ SOIL CONSERVATION SERVICE

Collaborating with
CALIFORNIA DEPARTMENT of WATER RESOURCES
and
BRITISH COLUMBIA DEPARTMENT of
LANDS, FORESTS and WATER RESOURCES

AS OF
MAR. 1, 1976

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1900 snow courses in Western United States and in the Columbia Basin in British Columbia. Networks of automatic snow water equivalent and related data sensing devices, along with radio telemetry are expanding and will provide a continuous record of snow water and other parameters at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

COVER PHOTO: SURVEYOR ENROUTE TO THE MT. BALDY ARIZONA SNOW COURSE
SCS PHOTO AZ-5460

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, West Technical Service Center, Room 111, 511 N.W. Broadway, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	204 E. 5th. Ave., Room 217, Anchorage, Alaska 99501
Arizona	6029 Federal Building, Phoenix, Arizona 85025
Colorado (N. Mex.)	P. O. Box 17107, Denver, Colorado 80217
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 98, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1220 S.W. Third Ave., Portland, Oregon 97204
Utah	4012 Federal Bldg., 125 South State St., Salt Lake City, Utah 84138
Washington	360 U.S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 2440, Casper, Wyoming 82601

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia



WATER SUPPLY OUTLOOK FOR WESTERN UNITED STATES

Including Columbia River Drainage in Canada

ISSUED

MARCH 1, 1976

The Soil Conservation Service coordinates snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Corps of Engineers, Forest Service, National Park Service, NOAA, National Weather Service, Geological Survey, and other Federal Agencies, Departments of State Government, Irrigation Districts, Power Companies, and others.

The Department of Water Resources coordinates snow surveys in California.

The Water Resources Service, Department of Lands, Forests, and Water Resources directs snow surveys in British Columbia.

This report was prepared by the Water Supply Forecasting Unit, Engineering Division, Soil Conservation Service, from data supplied by Snow Survey Supervisors of the Soil Conservation Service in the States of Alaska, Arizona, Colorado and New Mexico, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

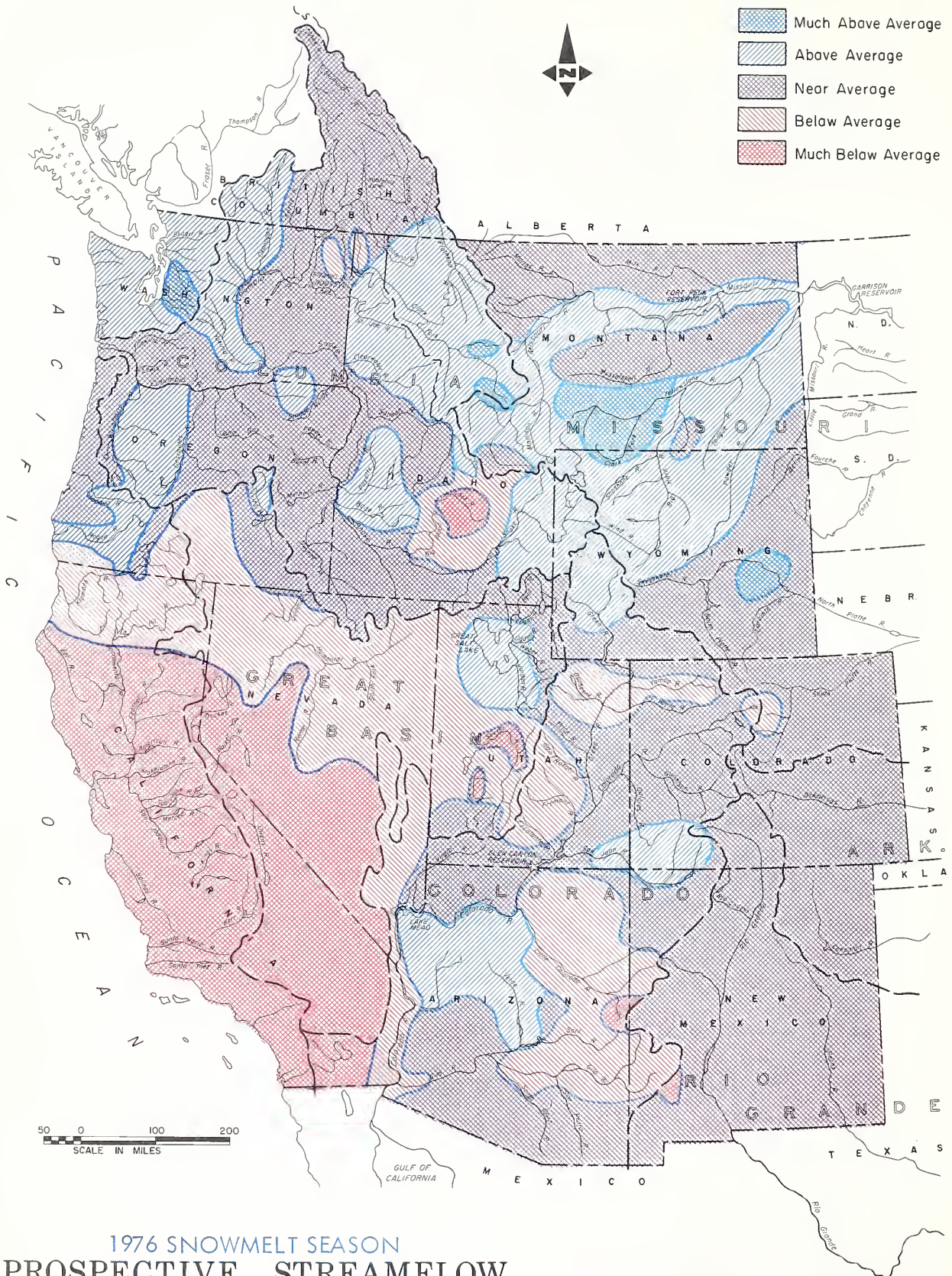
Data from California was supplied by the Chief, Water Supply Forecast and Snow Survey Unit, Department of Water Resources.

Data from British Columbia was supplied by the Chief, Hydrology Division, Water Investigations Branch, Department of Lands, Forests and Water Resources.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
R.M. DAVIS, ADMINISTRATOR

M7-L-22030B

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1976 SNOWMELT SEASON
 PROSPECTIVE STREAMFLOW
 AS OF MARCH 1, 1976

WATER SUPPLY OUTLOOK

1976 SNOWMELT SEASON
MARCH 1, 1976

THE WATER SUPPLY OUTLOOK IS NOW GOOD TO EXCELLENT OVER A LARGE PORTION OF THE WESTERN UNITED STATES. HOWEVER, BELOW NORMAL RUNOFF IS FORECAST FROM STREAMS IN THE SOUTHWEST. THE OUTLOOK HAS IMPROVED IN MOST AREAS DUE TO HEAVY SNOWS IN MOUNTAINOUS AREAS DURING FEBRUARY. RESERVOIR STORAGE IS NORMAL OR ABOVE, AND WILL HELP EASE SHORTAGES EXPECTED IN CALIFORNIA, NEVADA AND ARIZONA.

Snowfall during February was heavier than normal over a wide area of the western mountain watersheds. A series of storms moved across the southwest, breaking an extended dry spell. Some Arizona and southern Utah watersheds received two to three times their normal moisture for the month.

Higher mountainous areas of southern California did not benefit from the February storms, and nearly all Sierra Nevada rivers are still expected to yield much less than their normal quantities during snowmelt. Other deficient areas are found in western Utah, eastern Arizona, and the Big Lost-Little Wood river area of Idaho.

The Platte and Arkansas river systems also received more snow than usual during the month. An area of heavy snowpacks is found in central Wyoming, and the creeks flowing from the Laramie Mountains into the North Platte will be well above normal this spring. In Colorado the St. Vrain and Boulder River watersheds have snowpacks that are below the 15-year average. These streams are forecast to contribute less than their normal quantities to the South Platte River.

Elsewhere in the Platte-Arkansas watersheds the snowpack made some slight improvements. Spring and summer streamflow forecasts remain in the "near average" category. Carry-over reservoir storage is good along both stems of the Platte, but poor on the Arkansas.

The Rio Grande basin outlook improved substantially, due mostly to the heavy snows at higher elevations during February. Streamflow forecasts indicate the water supply should be average, with better than normal quantities impounded in the reservoir system.

Many Arizona and southern Utah watersheds received very heavy precipitation in February, and as a result, the forecasts for spring irrigation water supplies have been revised upward. During the past month streamflow was much above average and the Salt River Project reservoirs increased their storage to above normal totals.

Most of California and western Nevada will experience spring and summer runoff at much below normal rates. The Sierra Nevada snowpack is, in general, only about one-half its March 1 average. Some northern California streams and Nevada's Humboldt river drainage are forecast at in the range of 70 to 90 percent of normal. Reservoir storage is generally good and will supplement the low streamflow.

The Columbia River basin also received above normal moisture during the latter half of February. Virtually all Washington and Oregon streams are expected to yield normal or above average quantities. Similar conditions prevail in northern Idaho. However, some central Idaho watershed snowpacks continue to be shallower than normal and snowmelt runoff will be less than normal.

Major basin reports follow:

MISSOURI BASIN

The mountain snowpack is well above average along the Continental Divide in Montana and northwest Wyoming. The accumulation on the Milk, Sun, Red Rock, Marias, Teton, and St. Mary drainages of Montana is near the 15-year normal. The Yellowstone drainage continues to have a very heavy snowpack as does the Shoshone River watershed in Wyoming. The snowpack on most other streams flowing from the central Rockies into the Missouri River is near normal. An exception is found on the north end of Wyoming's Laramie range where a heavy pack has built up. About the only subnormal area is found in the St. Vrain-Clear Creek area of Colorado where the snowpack is lighter than the March 1 average.

Forecasts of snowmelt runoff during the coming spring and summer months remain in the normal to above average range. The only exceptions

SUMMARY OF SNOW WATER EQUIVALENT MEASUREMENTS

MAJOR BASIN AND SUB - WATERSHED	WATER EQUIVALENT IN PERCENT OF:		MAJOR BASIN AND SUB - WATERSHED	WATER EQUIVALENT IN PERCENT OF:	
	LAST YEAR	AVERAGE		LAST YEAR	AVERAGE
MISSOURI BASIN			SNAKE BASIN		
Jefferson	110	118	SNAKE above Jackson, Wyo.	140	130
Madison	121	121	SNAKE above Hiese, Idaho	128	122
Gallatin	107	110	SNAKE abv.American Falls Res.	119	123
Missouri Main Stem	110	111	Henry's Fork	122	116
Yellowstone	120	119	Southern Idaho Tributaries	88	103
Shoshone	134	159	Big and Little Wood	83	76
Wind	126	116	Boise	97	103
North Platte	110	106	Owyhee	60	100
South Platte	80	104	Payette	98	110
			Malheur	75	110
			Weiser	86	97
ARKANSAS BASIN			Burnt	90	105
Arkansas	80	99	Powder	85	100
Cucharas-Purgatoire	78	90	Salmon	105	108
			Grande Ronde	95	105
			Clearwater	--	--
RIO GRANDE BASIN			LOWER COLUMBIA BASIN		
Rio Grande (Colo.)	95	114	Yakima	76	101
Rio Grande (New Mexico)	68	102	Umatilla	110	145
Pecos	--	--	John Day	90	105
			Deschutes - Crooked	90	120
COLORADO BASIN			Hood	105	105
Green (Wyo.)	110	103	Willamette	105	130
Yampa - White	72	84	Lewis	136	116
Duchesne	94	92	Cowlitz	95	106
Price	90	100			
Upper Colorado	87	93	PACIFIC COASTAL BASIN		
Gunnison	88	100	Puget Sound	85	114
San Juan	103	121	Olympic Peninsula	116	112
Dolores	82	106	Umpqua - Rogue	75	115
Virgin	144	131	Klamath	75	105
Gila	60	73	Trinity	70	80
Salt	85	101			
Verde	126	131			
GREAT BASIN			CALIFORNIA		
Bear	98	101	CENTRAL VALLEY		
Logan	94	94	Upper Sacramento	70	85
Ogden	96	108	Feather	55	70
Weber	94	106	Yuba	50	60
Provo - Utah Lake	96	110	American	55	60
Jordan	91	103	Mokelumne	45	50
Sevier	94	94	Stanislaus	45	45
Walker - Carson	30	29	Tuolumne	50	50
Tahoe - Truckee	34	38	Merced	45	45
Humboldt	68	97	San Joaquin	45	40
Lake Co. (Oregon)	65	95	Kings	45	45
Harney Basin (Oregon)	85	115	Kaweah	50	40
Owens (California)	50	30	Tule	30	20
			Kern	45	30
UPPER COLUMBIA BASIN			Data for California Watersheds supplied by Dept. of Water Resources, and for British Columbia Watersheds by Dept. of Lands, Forests and Water Resources.		
Columbia (Canada)	109	110	Average is for the 1958-72 period. California averages are for the period 1931-70. Based on Selected Snow Courses determined by Distribution within the Basin, Length of Record and Re- petitive Monthly Measurement Schedules.		
Kootenai (U.S.)	90	97			
Clark Fork	105	113			
Bitterroot	109	125			
Flathead	97	97			
Spokane	95	102			
Okanogan	80	108			
Methow	74	81			
Chelan	98	124			
Wenatchee	84	110			

in the basin are the St. Vrain, Boulder and Clear Creeks in northern Colorado. These streams are expected to yield below average quantities. Elsewhere in the Centennial state the front range tributaries of the South Platte are expected to yield quantities near the 15-year average.

The North Platte is also forecast to discharge its normal amount into Seminoe reservoir in Wyoming. Deer and La Prele Creeks in the central part of the state are forecast at 75 percent more than average, due to the locality's heavy snowpack.

Streams heading in Wyoming's Bighorn Mountains are now expected to flow at rates above normal. The Wind River and Absaroka Mountain Range rivers will yield much above average quantities. This outlook extends into Montana, and the Yellowstone River forecast is now much above average.

Snowmelt runoff elsewhere in Montana will be above the 15-year average except for some central and northern streams. These drainages are expected to discharge near average amounts, and include the Marias, Milk, Beaverhead, Deerborn, Teton, Sun, Smith, Judith and Musselshell watersheds.

Reservoir storage remains good to excellent. Impoundments in the North Platte system are excellent, while most upper Missouri reservoirs are holding above normal quantities. The South Platte system carryover storage is slightly above the normal mark.

ARKANSAS BASIN

Spring and summer water supplies should be near the 15-year average over most of the Arkansas basin. Snowpacks are near their normal March 1 levels on the main stem of the Arkansas. Slightly below average accumulations were measured on the Cucharas and Purgatoire watersheds.

The Arkansas River is forecast to yield seven percent more than its normal snowmelt runoff at the Salida, Colorado gaging station. The Purgatoire and Cucharas Rivers are both expected to flow at about 10 percent below normal rates.

Reservoir storage remains poor. John Martin is still at only 10 percent

of its average March 1 level. Conchas reservoir only contains one-half its usual quantity.

RIO GRANDE BASIN

February storms improved the snowpack over most of the high elevations in the Rio Grande basin. In the Colorado portion of the watershed the accumulation is now about 15 percent above the March 1 normal. This represents an improvement of over 40 percent from last month. The New Mexico tributaries also got heavy snows which brought the pack up to the average March 1 level.

Streamflow forecasts are in the normal to above average range. The Rio Grande at Del Norte, Colorado is expected to yield 116 percent of its 15-year average flow. El Vado reservoir inflow is forecast at 10 percent above normal.

Carryover reservoir storage remains excellent. Elephant Butte is 63 percent above its March 1 average level. Other reservoirs in the system have a combined impoundment of nearly twice their usual amount.

COLORADO BASIN

Wet February weather greatly improved the water supply outlook in portions of Arizona, southern Utah and southwestern Colorado. However, in comparison to normal, the upper Colorado and Green River portions of the basin remained about as they were one month ago.

The snowpack was increased substantially by the heavy storms which dumped as much as three or four times the usual February amounts on some watersheds. As an example the snowpack on the Virgin River in Utah was only about one-half of its normal one month ago. Now the pack is nearly 30 percent above average. Similar gains were made on the San Juan and Verde watersheds. Gains of up to 20 percent were noted on the Gila and Verde, and upstream on the Gunnison and Dolores. One month ago the snowpack was below normal over nearly the entire basin, with the upper Green River the only exception. As of March 1 most areas are now above normal--the exceptions being the Gila, at 73 percent; the

SELECTED STREAMFLOW FORECASTS

MARCH 1, 1976

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
SASKATCHEWAN				
St. Mary near Babb, Montana <u>1/</u>	485	99	April-Sept.	--
UPPER MISSOURI				
Beaverhead near Grant, Montana <u>2/</u>	130	102	April-Sept.	248
Big Hole near Melrose, Montana	970	130	April-Sept.	--
Madison near Grayling, Montana <u>3/</u>	570	119	April-Sept.	529
Gallatin near Gateway, Montana	625	118	April-Sept.	--
Sun at Gibson Dam, Montana <u>4/</u>	590	100	April-Sept.	829
Belt near Monarch, Montana	145	118	April-Sept.	--
Marias near Shelby, Montana <u>5/</u>	530	95	April-Sept.	1,216
Missouri near Landusky, Montana <u>6/</u>	5,300	112	April-Sept.	--
near Williston, North Dakota <u>7/</u>	14,700	125	April-Sept.	--
S. Fk. Musselshell above Martinsdale, Montana	53	106	April-Sept.	--
Milk at Eastern Crossing, Montana	260	91	March-Sept.	--
Yellowstone at Yellowstone Lake Outlet, Wyo.	1,005	122	April-Sept.	844
at Corwin Springs, Montana	2,600	130	April-Sept.	2,159
at Miles City, Montana <u>8/</u>	8,100	127	April-Sept.	--
Clarks Fork near Belfry, Montana	800	132	April-Sept.	--
Shoshone below Buffalo Bill Res., Wyo. <u>9/</u>	1,100	133	April-Sept.	917
Wind near Dubois, Wyoming	135	132	April-Sept.	126
at Riverton, Wyoming <u>10/</u>	809	122	April-Sept.	742
below Boysen Res., Wyoming <u>11/</u>	1,200	119	April-Sept.	1,206
Bull Lake Creek near Lenore, Wyoming	189	104	April-Sept.	--
Little Popo Agie near Lander, Wyoming	54	113	April-Sept.	--
Tensleep near Tensleep, Wyoming	72	91	April-Sept.	--
Medicine Lodge near Hyattville, Wyoming	24	113	April-Sept.	--
Shell Creek near Shell, Wyoming	84	115	April-Sept.	--
Big Horn near St. Xavier <u>8/</u>	2,300	124	April-Sept.	2,497
Tongue near Dayton, Wyoming	126	112	April-Sept.	176
No. Fork Powder near Hazelton, Wyoming	12	125	April-Sept.	15
PLATTE				
North Platte at Sinclair, Wyoming	620	96	April-Sept.	789
Encampment near Encampment, Wyoming	146	104	April-Sept.	192
Laramie & Pioneer Canal, near Woods, Wyo. <u>12/</u>	127	100	April-Sept.	124
Big Thompson at Drake, Colorado <u>13/</u>	103	96	April-Sept.	--
Clear at Golden, Colorado <u>14/</u>	100	79	April-Sept.	--
St. Vrain at Lyons, Colorado <u>15/</u>	65	87	April-Sept.	--
Cache LaPoudre near Fort Collins, Colorado <u>16/</u>	240	97	April-Sept.	--
ARKANSAS				
Arkansas at Salida, Colorado <u>17/</u>	335	107	April-Sept.	--
Cucharas near LaVeta, Colorado	9	90	April-Sept.	--
Purgatoire at Trinidad, Colorado	34	89	April-Sept.	--
RIO GRANDE				
Rio Grande near Del Norte, Colorado <u>18/</u>	540	116	April-Sept.	--
at Otowi Bridge, New Mexico <u>19/</u>	575	109	March-July	--
Conejos near Mogote, Colorado <u>20/</u>	196	106	April-Sept.	--
El Vado Res., Inflow, New Mexico	210	110	March-July	--
Pecos at Pecos, New Mexico	50	122	March-July	--
UPPER COLORADO				
Colorado, Grandby Res., Inflow, Colorado <u>21/</u>	220	96	April-Sept.	--
near Dotsero, Colorado <u>22/</u>	1,400	98	April-Sept.	--
near Cameo, Colorado <u>23/</u>	2,300	97	April-Sept.	--
near Cisco, Utah <u>24/</u>	2,990	106	April-July	4,038
Lake Powell Inflow, Arizona <u>25/</u>	6,826	99	April-July	10,407
Roaring Fork at Glenwood Springs, Colorado <u>26/</u>	715	100	April-Sept.	--
Uncompahgre at Colona, Colorado	140	104	April-Sept.	--
Gunnison, Blue Mesa Res. Inflow, Colorado <u>27/</u>	825	104	April-Sept.	--

Forecasts in California provided by Department of Water Resources.
Average is for 1958-72 period except California. California is computed for 1921-70 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.

Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS

MARCH 1, 1976

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLORADO (continued)				
Gunnison, near Grand Junction, Colorado <u>28/</u>	1,175	99	April-Sept.	--
Dolores at Dolores, Colorado	270	116	April-Sept.	--
Green at Warren Bridge, Wyoming	370	113	April-Sept.	335
at Green River, Wyoming <u>29/</u>	1,100	111	April-Sept.	1,167
Flaming Gorge Res. Inflow, Utah <u>27/</u>	1,275	109	April-July	1,635
at Green River, Utah <u>30/</u>	2,626	92	April-July	4,082
Big Sandy near Big Sandy, Wyoming	63	110	April-Sept.	72
Yampa at Steamboat Springs, Colorado	225	82	April-Sept.	--
near Maybell, Colorado	750	83	April-Sept.	--
Little Snake near Dixon, Wyoming	330	110	April-Sept.	--
White near Meeker, Colorado	270	92	April-Sept.	--
Strawberry at Duchesne, Utah <u>40/</u>	60	107	April-July	65
Duchesne near Tabiona, Utah <u>31/</u>	90	86	April-July	--
at Randlett, Utah <u>40/</u>	160	73	April-July	--
Lakefork below Moon Lake, Utah <u>32/</u>	56	81	April-July	82
Uinta near Neola, Utah	62	70	April-July	99
Whiterocks near Whiterocks, Utah	44	76	April-July	79
Price, Scofield Res. Inflow, Utah <u>33/</u>	36	106	April-July	--
Cottonwood near Orangeville, Utah <u>34/</u>	38	83	April-July	--
San Juan, Navajo Res. Inflow, New Mexico <u>27/</u>	675	113	April-July	--
near Bluff, Utah <u>35/</u>	988	116	April-July	--
Animas at Durango, Colorado	460	109	April-Sept.	--
LOWER COLORADO				
Virgin near Virgin, Utah	42	88	April-June	46
Little Colorado above Lyman, Arizona	5	55	March-June	10
Gila near Solomon, Arizona	70	77	March-May	130
Fisco at Clifton, Arizona	34	72	March-May	68
Salt at Intake, Arizona	175	78	March-May	404
Tonto above Roosevelt, Arizona	25	108	March-May	23
Verde above Horseshoe Dam, Arizona	138	121	March-May	114
GREAT BASIN				
Bear at Utah-Wyo. State Line	105	94	April-July	140
at Harer, Idaho	280	94	April-Sept.	--
Smith's Fork near Border, Wyoming	110	95	April-Sept.	134
Thomas Fork near Wyo.-Ida. State Line	30	93	April-Sept.	42
Logan near Logan, Utah <u>36/</u>	110	97	April-July	140
Ogden, Pine View Res. Inflow, Utah <u>27/</u>	128	116	April-June	181
Weber near Oakley, Utah	98	98	April-June	104
Provo near Hailstone, Utah <u>37/</u>	109	107	April-July	--
Strawberry Res. Inflow, Utah	54	120	April-July	--
Utah Lake Net Inflow, Utah	230	111	April-July	--
Big Cottonwood near Salt Lake City, Utah	42	117	April-July	50
Beaver near Beaver, Utah	14	70	April-July	18
Sevier near Hatch, Utah	37	90	April-July	35
near Gunnison, Utah	24	62	April-July	55
So. Fork Humboldt near Elko, Nevada	63	89	March-July	--
Humboldt at Palisades, Nevada	175	80	March-July	48
Truckee at Farad, California <u>38/</u>	150	56	March-July	367
East Carson near Gardnerville, Nevada	121	61	March-July	243
West Carson at Woodsfords, California	46	82	March-July	66
East Walker near Bridgeport, California <u>39/</u>	37	49	March-July	98
West Walker near Coleville, California	96	64	March-July	184
Donner und Blitzen near Frenchglen, Oregon	54	99	March-July	--
Silvies near Burns, Oregon	100	106	March-July	--
Chewaucan near Paisley, Oregon	70	80	March-July	98
Deep above Adel, Oregon	58	77	March-July	--
Bidwell near Ft. Bidwell, California	9	78	April-July	12
Owens below Long Valley Res., California	--	--	April-July	--

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Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS

MARCH 1, 1976

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLUMBIA				
Columbia at Birchbank, British Columbia 40/	46,800	101	April-Sept.	41,188
at Grand Coulee, Washington 40/	73,000	106	April-Sept.	66,512
below Rock Island, Washington	80,000	106	April-Sept.	74,143
Kootenai near Libby, Montana	7,350	99	April-Sept.	6,388
at Leonia, Idaho	8,900	98	April-Sept.	8,093
Blackfoot near Bonner, Montana	1,280	124	April-Sept.	1,371
So. Fk. Flathead nr Columbia Falls, Montana 40/	2,400	101	April-Sept.	2,520
Flathead at Columbia Falls, Montana 40/	6,400	100	April-Sept.	6,794
near Polson, Montana 40/	7,650	100	April-Sept.	7,895
Clark Fork above Missoula, Montana	2,270	124	April-Sept.	2,722
near Plains, Montana 40/	13,700	109	April-Sept.	14,101
at Whitehorse Rapids, Idaho	15,400	109	April-Sept.	--
Bitterroot near Darby, Montana	750	128	April-Sept.	736
Priest near Priest River, Idaho	700	80	April-July	--
Pend Oreille below Box Canyon, Washington	17,200	108	April-Sept.	17,559
Kettle near Laurier, Washington	2,020	108	April-Sept.	1,921
Spokane at Post Falls, Idaho	3,350	111	April-Sept.	--
Similkameen near Nighthawk, Washington	1,740	115	April-Sept.	1,409
Okanogan near Tonasket, Washington	2,040	118	April-Sept.	1,584
Methow near Pateros, Washington	1,220	118	April-Sept.	--
Stehekin at Stehekin, Washington	1,060	118	April-Sept.	--
Chelan at Chelan, Washington 43/	1,510	121	April-Sept.	1,368
Wenatchee at Peshastin, Washington	2,080	116	April-Sept.	2,000
SNAKE				
Snake above Palisades Res., Wyoming 44/	3,350	128	April-Sept.	2,838
near Heise, Idaho 45/	4,700	119	April-Sept.	4,494
near Blackfoot 46/	5,000	120	April-July	--
at Weiser, Idaho	7,050	108	April-Sept.	--
Grey's above Palisade, Wyoming	425	110	April-Sept.	424
Salt above Palisade, Wyoming	370	101	April-Sept.	524
Henry's Fork near Ashton, Idaho 47/	775	115	April-Sept.	--
Teton near St. Anthony, Idaho	530	120	April-Sept.	--
Big Lost near Mackay, Idaho 48/	124	68	April-Sept.	--
Portneuf at Topaz, Idaho	105	113	March-Sept.	--
Salmon Falls Creek nr San Jacinto, Idaho	85	101	March-Sept.	--
Big Wood, Inflow to Magic Res., Idaho 49/	250	83	April-Sept.	--
Bruneau near Hot Springs, Idaho	240	106	March-Sept.	--
Boise near Boise, Idaho 50/	1,850	115	April-Sept.	--
Owyhee near Owyhee, Nevada 51/	82	101	March-July	144
Owyhee Res. Net Inflow, Oregon 27/	452	105	March-July	1,072
Malheur near Drewsey, Oregon	89	95	March-July	--
Payette near Horseshoe Bend, Idaho 52/	2,110	114	April-Sept.	--
Weiser above Crane Creek, Idaho 40/	530	104	March-Sept.	--
Burnt near Hereford, Oregon 40/	43	102	March-July	--
Powder near Sumpter, Oregon	51	93	April-July	--
Eagle above Skull Creek, Oregon	179	102	March-July	--
Imnaha at Imnaha, Oregon	292	95	April-Sept.	--
Salmon at Whitebird, Idaho	7,500	108	April-Sept.	--
Lostine near Lostine, Oregon	122	98	April-Sept.	--
Grand Ronde at LaGrande, Oregon	212	110	March-Sept.	300
Clearwater at Spalding, Idaho	9,900	115	April-Sept.	--
LOWER COLUMBIA				
Yakima at CleElum, Washington 53/	1,060	110	April-Sept.	--
near Parker, Washington 54/	2,150	124	April-Sept.	--
Naches near Naches, Washington 55/	1,060	110	April-Sept.	--
Walla Walls, So. Fk. near Milton, Oregon	91	115	March-Sept.	--

Forecasts in California provided by Department of Water Resources.
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Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS

MARCH 1, 1976

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
LOWER COLUMBIA (continued)				
Umatilla at Pendleton, Oregon	224	112	March-Sept.	--
John Day, Middle Fork at Ritter, Oregon	126	98	March-July	--
North Fork at Monument, Oregon	644	100	March-July	--
Crooked near Post, Oregon	142	105	March-July	--
Deschutes at Benham Falls, Oregon 40/	392	109	April-July	--
Columbia at The Dalles, Oregon 40/	113,000	108	April-Sept.	109,012
at The Dalles, Oregon 40/	96,000	107	April-July	94,328
McKenzie near Vida, Oregon	1,151	111	April-July	--
Santiam, South, at Waterloo, Oregon	677	120	April-July	--
North, at Mehama, Oregon 40/	918	120	April-July	--
Clackamas at Estacada, Oregon	748	111	April-July	--
Willamette at Salem, Oregon 40/	5,047	115	April-July	--
Lewis at Ariel, Washington 56/	1,360	102	April-Sept.	1,196
Cowlitz at Castle Rock, Washington 57/	2,990	108	April-Sept.	2,652
NORTH PACIFIC COASTAL				
Dungness near Sequim, Washington	200	121	April-Sept.	--
Umpqua, No., near Toketee Falls, Oregon 40/	187	113	April-Sept.	--
Rogue at Raygold, Oregon	823	111	April-July	1,030
Klamath Lake, Net Inflow, Oregon	695	96	March-July	869
Trinity at Lewiston, California	440	71	April-July	895
CALIFORNIA CENTRAL VALLEY 40/				
Sacramento, Inflow to Shasta, California	1,410	79	April-July	2,369
Feather near Oroville, California	965	52	April-July	2,634
Yuba at Smartville, California	500	46	April-July	1,378
American, Inflow to Folsom Res., Calif.	485	37	April-July	1,648
Cosumnes at Michigan Bar, California	45	34	April-July	191
Mokelumne, Inflow to Pardee Res., Calif.	190	41	April-July	605
Stanislaus, Inflow to Melones Res., Calif.	265	37	April-July	932
Tuolumne, Inflow to Don Pedro Res., Calif.	485	39	April-July	1,490
Merced, Inflow to Excheque Res., Calif.	250	41	April-July	817
San Joaquin, Inflow to Millerton Lake, Calif.	425	36	April-July	1,413
Kings, Inflow to Pine Flat Res., California	480	41	April-July	1,266
Kaweah, Inflow to Terminus Res., California	95	35	April-July	296
Tule, Inflow to Success Res., California	12	20	April-July	67
Kern, Inflow to Isabella Res., California	120	29	April-July	368
ALASKA				
Yukon River at Eagle, Alaska	28,500	83	April-July	45,000
at Ruby, Alaska	55,000	82	April-July	80,000
Porcupine River at Ft. Yukon, Alaska	5,500	76	April-July	7,500
Little Chena nr Fairbanks, Alaska	65	72	April-July	76
Chena River at Fairbanks, Alaska	425	76	April-July	500
Salcha River nr Salchaket, Alaska	580	76	April-July	610
Ship Creek nr Anchorage	50	85	April-July	72
So. Fk. Campbell Creek at Canyon Mouth nr Anchorage	12	78	April-July	19

Forecasts in California provided by Department of Water Resources.

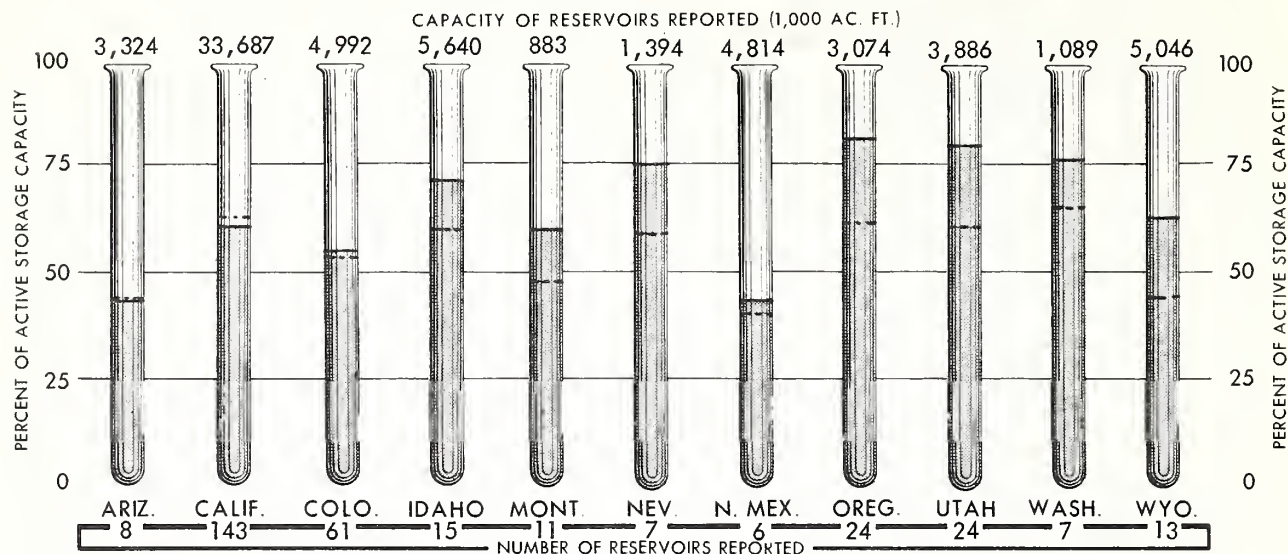
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--- AVERAGE
 □ THIS YEAR



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The Green River forecasts are slightly higher than those issued one month ago, standing at 10 to 15 percent above the 15-year norm. An area of northeast Utah and northwest Colorado will experience sub-normal flows this summer unless late spring precipitation is well above normal.

The Yampa River is forecast to yield 83 percent of its average while the Duchesne is expected to flow at three-fourths its normal rate. Similar conditions prevail on the Cottonwood, Whiterocks, and Unita.

The combined effect of all the tributaries above Lake Powell results in an expected flow of the Colorado

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GREAT BASIN

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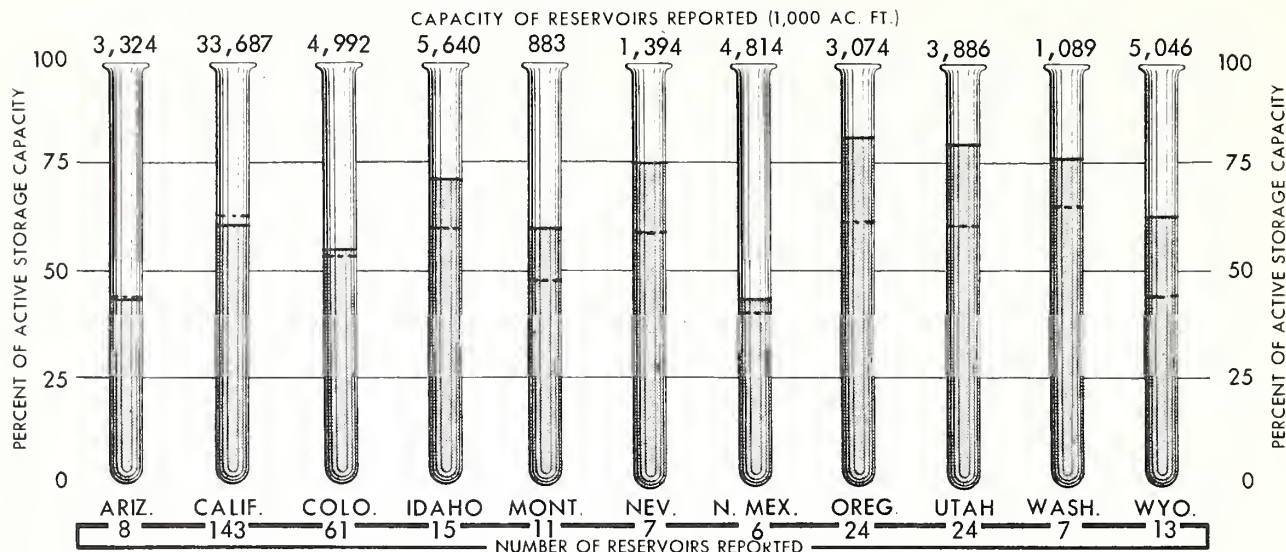
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STORAGE IN LARGE RESERVOIRS

MARCH 1, 1976

BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE	BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE
UPPER MISSOURI				UPPER COLUMBIA			
Belle Fourche	185	104	104	Chelan	676	463	197
Boysen	550	259	99	Coeur d'Alene	225	130	80
Buffalo Bill	373	198	131	Duncan	1,400	162	128
Canyon Ferry	2,043	1,693	105	Flathead	1,791	926	92
Fort Peck	19,140	17,340	132	Hungry Horse	3,428	2,570	110
Garrison	24,790	19,249	137	Kootenay	787	444	102
Hebgen	377	288	142	Lake Koocanusa	5,694	970	--
Keyhole	192	128	171	Lower Arrow	2,691	1,346	952
Lake Francis Case	5,816	3,711	101	Noxon Rapids	335	262	87
Lake Sharpe	1,900	1,751	103	Pend Oreille	1,155	500	109
Oahe	23,630	18,940	123	Roosevelt	5,232	3,371	119
Tiber	1,347	571	99	Upper Arrow	4,400	1,948	480
Bighorn Lake	1,356	836	104				
PLATTE				LOWER COLUMBIA			
So. Platte in Colo. (30)	1,085	823	106	Cougar	155	51	122
City of Denver (7)	622	467	101	Detroit	300	88	79
Colo-Big Thompson (3)	718	502	120	Green Peter	270	110	100
Glendo	784	420	115	Hills Creek	200	80	133
Pathfinder	1,016	847	221	Lookout Point	337	90	93
Seminole	1,010	566	169	Prineville	153	110	98
				Wickiup	200	190	113
				Yakima Res. (5)	1,066	812	117
ARKANSAS				SNAKE			
Conchas	273	84	45	American Falls	1,125	964	122
John Martin	354	9	10	Anderson	423	258	109
Turquoise	130	50	--	Arrowrock	287	274	110
RIO GRANDE				Brownlee	980	493	104
Elephant Butte	2,195	716	163	Cascade	653	393	121
New Mexico Res. (4)	539	171	190	Dworshak	2,016	531	210
UPPER COLORADO				Jackson	847	633	119
Blue Mesa	830	445	--	Lucky Peak	278	67	75
Flaming Gorge	3,749	3,304	208	Owyhee	715	681	151
Navajo	1,696	1,100	91	Palisades	1,200	904	112
Powell	25,002	19,838	--	Warm Springs	191	138	143
Starvation	165	141	--				
LOWER COLORADO				PACIFIC COASTAL			
Havasu	619	538	100	Clair Engle	2,448	1,845	88
Mead	26,159	20,528	119	Clear Lake	440	288	127
Mohave	1,810	1,681	100	Nacimienta	350	292	140
Salt River Res. (4)	1,755	1,129	102	Ross	1,052	754	158
San Carlos	1,093	132	69	Upper Klamath	584	354	84
Verde River Res. (2)	318	161	110				
GREAT BASIN				CALIFORNIA CENTRAL VALLEY			
Bear	1,421	1,049	110	Almanor	1,308	582	78
Lahontan	291	215	105	Berryessa	1,602	1,332	84
Rye Patch	157	164	173	Bullards Bar	961	299	58
Sevier Bridge	236	178	178	Folsom	1,010	582	95
Strawberry	274	244	209	Isabella	570	167	87
Tahoe	732	502	113	McClure	1,026	619	110
Utah	884	940	156	Millerton	521	338	94
Willard Bay	193	163	134	Oroville	3,538	2,751	109
				Pine Flat	1,002	503	85
				Shasta	4,552	3,036	87

Reservoir Storage Data Provided by Bureau of Reclamation, Corps of Engineers, Geological Survey, and water using organizations. Data from California and British Columbia provided by Department of Water Resources and Department of Lands, Forests and Water Resources, respectively.

the south, the Walker, Carson and Owens drainages have about 30 percent of normal accumulations of snow.

In south central Oregon, Lake County drainages now have near average snowpacks, and improvement of about 20 percent over last month. The Harney basin improved about 10 percent.

Forecasts of snowmelt runoff have been revised upward over much of the Great Basin. The Bear River-Smith's Fork-Thomas Fork drainages are now predicted to yield about 95 percent of average flows. The Ogden, Provo, and Big Cottonwood forecasts are about 15 percent above average. Strawberry reservoir inflow is expected to be 20 percent above normal. To the south, the Sevier is still lacking snow and is predicted to yield only 62 percent at Gunnison.

The Humbolt is forecast to discharge 80 percent of average at Palisades, Nevada, but the South Fork near Elko is expected to flow at 89 percent of its normal rate. From the Sierra Nevada, flows will be much below normal. The West Carson is in the best shape, with a forecast of 82 percent of average. However, the East Carson is forecast at 61 percent while the West and East Walker predictions are for 64 and 49 percent, respectively. The Truckee forecast is for 56 percent of average at Farad, California.

Irrigation supplies will be supplemented by generally excellent reservoir storage. However, some shortages will occur where users are dependent solely on direct diversion from streams heading in the Sierras. Similar conditions will exist in southern and western Utah. However, the outlook is for above normal supply in the vicinity of the Great Salt Lake.

COLUMBIA BASIN

The first part of February was quite dry over most of the Columbia Basin but heavy snowfall during the latter half of the month resulted in improved conditions. Basin-wide, the accumulation is now about nine percent above the March 1 average. The most dramatic improvement was on the Clackamas, Cowlitz and Lewis Rivers of Oregon and Washington where the current snowpack is now above normal. Last month these

watersheds were only two-thirds to three-fourths of average.

Most middle and upper Snake River watersheds have improved snowpacks, as precipitation during the month was heavy over southern and southeastern Idaho. Record or near record snowpacks were measured in Montana on the Upper Clark Fork. However, below normal conditions were found by snow survey teams west of Kalispell and Poulson.

The only areas in the basin where the February additions to the snowpack were below normal are the Similkameen and Okanogan watersheds in British Columbia, according to reports from the Provincial Water Resources Service, Department of Lands, Forests and Water Resources.

The water supply outlook is for generally adequate to excellent supplies. Streamflow forecasts call for above average yields from the upper Snake River, Montana tributaries to the upper Columbia, the Yakima-Wenatchee-Methow watersheds of Washington, and the Willamette basin in Oregon.

An area of sub-normal snowmelt runoff forecasts is found in central Idaho. The Big and Little Lost and Wood Rivers are expected to yield only two-thirds to three-fourths of their normal quantities. Below average flows are also expected from the Priest River in northern Idaho and the Colville River across the border in Washington.

The combined effect of all the tributaries results in forecasts of the Columbia River of: average at Birchbank, B. C.; 6 percent above normal at Grand Coulee; and 8 percent above average during the April-September period at The Dalles.

Reservoir storage continues at excellent levels throughout the basin. Impoundments in Chelan and Dworshak are currently about double the usual March 1 quantities.

CALIFORNIA

The California Department of Water Resources, coordinating agency for snow surveys and water supply forecasting in California, reports that lack of normal precipitation over most of the Sierra during February has resulted in a continuation of the winter drought. The

prolonged drought has also forced twenty-nine counties to request natural disaster status because of inadequate rainfall on dry farmed rangeland. Also, several municipal and irrigation water agencies are either considering rationing or have initiated plans to limit water use. Those water users who have access to surface stored supplies are increasing ground water use and stretching their irrigation schedules to insure adequate supplies during this coming summer's peak use period.

March 1 snow surveys show that the snow water content is about one-half the normal seasonal accumulation for this date. Considering that about 85 percent of the total seasonal accumulation usually occurs by March 1, the prospects for reaching normal snow conditions during the remainder of this season are poor.

Precipitation during February was erratic over the state, with extreme northern and southern California, and the Central Coast, receiving above normal precipitation. Above normal precipitation also occurred on the San Joaquin Valley floor, where up to 200 percent of normal rainfall was reported from several stations in the Fresno area. The remainder of the state, including the high Sierra, had below normal precipitation, with the Sacramento Valley floor receiving only 30 percent of normal rainfall for the month. Water year precipitation, October 1 to date, remains below average throughout the state. Precipitation in the Central Valley area for the 5-month period has averaged about 50 percent of normal.

February runoff in California ranged from near zero in the San Francisco Bay area to 70 percent of normal for the Walker River on the east side of the Sierra. In the Central Valley, runoff ranged from 11 percent of normal for the Cosumnes River to a high of about 50 percent of normal for the Sacramento River inflow to Shasta Lake. Most Central Valley streams produced about one-third of their normal February runoff. As a result of below normal conditions on Central Valley tributaries, the runoff forecasts for most streams, for the April through July period, have been reduced from those reported one month ago.

Reservoir storage was 20,840,000 acre-feet (25.7×10^9 cubic meters) on March 1 in the 143 reservoirs monitored. This is about 95 percent of average and 60 percent of capacity for this date and 1,346,000 acre-feet (1.6×10^9 cubic meters) less than was impounded one year ago. Present storage is 90 percent of average in the Sacramento Valley area and 105 percent of average in the San Joaquin Valley. Even though inflows are low, and will continue low under present conditions, this current storage, coupled with ground

water use, will avert major water deficiencies in the Central Valley this year.

ALASKA

Snowfall during February was generally below the average expected for the month. The total winter's snowpack, therefore, remains well below normal over most of Alaska.

With the exception of the Brooks Range, which is only 14 percent below normal, interior Alaska is in a range of 20 to 40 percent below normal. Areas adjacent to the Gulf of Alaska, however, are near average. Mild temperatures have reduced snow cover to below normal levels at low elevations, but the higher elevations are generally above normal.



EXPLANATION of STREAMFLOW FORECASTS

All flows are observed flows except as adjusted for: 1/ Storage change in Lake Sherburne. 2/ Storage change in Lima and Clark Canyon reservoirs. 3/ Storage change in Hebgen Lake. 4/ Storage change in Gibson Reservoir and measured diversions. 5/ Storage change in Two Medicine, Four Horns, Lake Francis and Swift reservoirs. 6/ Storage change in Canyon Ferry and Tiber reservoirs. 7/ Changes as indicated in (6/), (8/), plus storage change in Fort Peck. 8/ Storage change in Boysen, Buffalo Bill, Bull Lake and Yellowtail reservoirs. 9/ Storage change in Buffalo Bill Reservoir plus Heart Mountain diversion. 10/ Storage change in Pilot Butte and Bull Lake reservoirs plus Wyoming canal diversion.

11/ Changes indicated in (10/) plus storage change in Boysen Reservoir. 12/ Plus diversions to Cache LaPoudre. 13/ Plus by-pass to power plants. 14/ Minus diversion thru Gumlick Tunnel. 15/ Storage change in Price Reservoir. 16/ Minus diversions from North Platte, Laramie and Colorado rivers plus measured diversions above station. 17/ Storage change in Clear Creek, Twin Lakes and Turquoise reservoirs minus diversions from Colorado River. 18/ Storage change in Rio Grande, Santa Maria and Continental reservoirs. 19/ Storage change in El Vado and Abiquiu reservoirs. 20/ Storage change in Platoro Reservoir.

21/ Storage change in Grandby Reservoir as furnished by U.S.B.R. plus diversions by Adams Tunnel and Grand River Ditch. 22/ Changes as indicated in (21/) plus diversions thru Roberts, Gumlick and Moffat tunnels and storage change in Dillon, Homestake, Williams Fork, Green Mountain and Willow Creek reservoirs. 23/ Changes indicated in (22/) and (26/). 24/ Storage change in Blue Mesa Reservoir. 25/ Changes indicated in (24/), (30/) and (35/) and storage change in Lake Powell. 26/ Diversions to Arkansas River plus storage change in Ruedi Reservoir. 27/ (Inflow record as computed by U. S. Bureau of Reclamation.) 28/ Storage change in Taylor, Blue Mesa and Morrow Point reservoirs. 29/ Storage change in Fontenelle Reservoir. 30/ Storage change in Flaming Gorge Reservoir.

31/ Plus diversion through Duchesne Tunnel. 32/ Storage change in Moon Lake Reservoir. 33/ Storage change in Scofield Reservoir. 34/ Storage change in Joe's Valley Reservoir. 35/ Storage change in Navajo Reservoir. 36/ Plus U. P. & L. Co. tailrace and Logan, Hyde Park and Smithfield canals. 37/ Minus diversions thru Duchesne Tunnel and Weber-Provo Canal. 38/ Storage change in Lake Tahoe and Boca reservoirs (Forecast by Truckee Basin Committee.) 39/ Storage change in Bridgeport Reservoir. 40/ Corrected for major upstream impairments -- represents simulated natural flow conditions.

41/ Storage change in Priest Lake. 42/ Storage change in Coeur d'Alene Lake and diversions by Spokane Valley Farms Co. and Rathrum Prairie canals. 43/ Storage change in Lake Chelan. 44/ Storage change in Jackson Lake. 45/ Storage change in Jackson Lake and Palisade reservoirs. 46/ Storage change in Jackson Lake, Palisades, Island Park, Henry's Lake, Grassy Lake plus diversions between Heise and Blackfoot. 47/ Storage change in Henry's Lake and Island Park reservoirs. 48/ Storage change in Mackay Reservoir and diversion in Sharp Ditch. 49/ Combined flow Big Wood near Bellevue and Camas Creek near Blaine. 50/ Storage change in Arrowrock, Anderson Ranch and Lucky Peak reservoirs.

51/ Storage change in Wild Horse Reservoir. 52/ Storage change in Cascade and Deadwood reservoirs. 53/ Storage change in Keechelus, Kachess and CleElum reservoirs plus diversion by Kittitas Canal. 54/ Changes indicated in (52/) plus storage change in Bumping and Rimrock Lakes plus diversion by Roza, Union Gao, New Reservation, Old Reservation and Sunrise canals. 55/ Storage change in Bumping and Rimrock lakes and diversions by Tieton, Selah Valley, Wapatox canals and City of Yakima. 56/ Storage change in Merwin, Yale and Swift reservoirs. 57/ Storage change in Mayfield Reservoir.

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necessary for forecasting
water supply for irrigation,
domestic and municipal water
supply, hydro-electric power
generation, navigation,
mining and industry

*"The Conservation of Water begins
with the Snow Survey"*